Single Page Applications

Modular situational awareness tools for data visualization

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In cooperation with:
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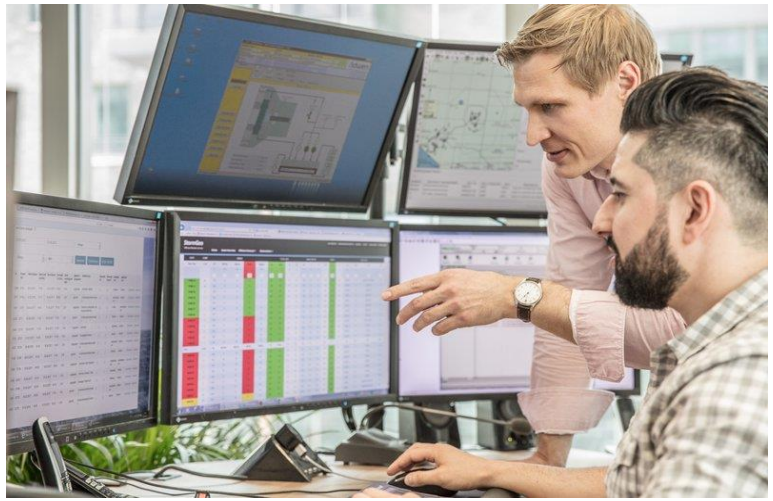
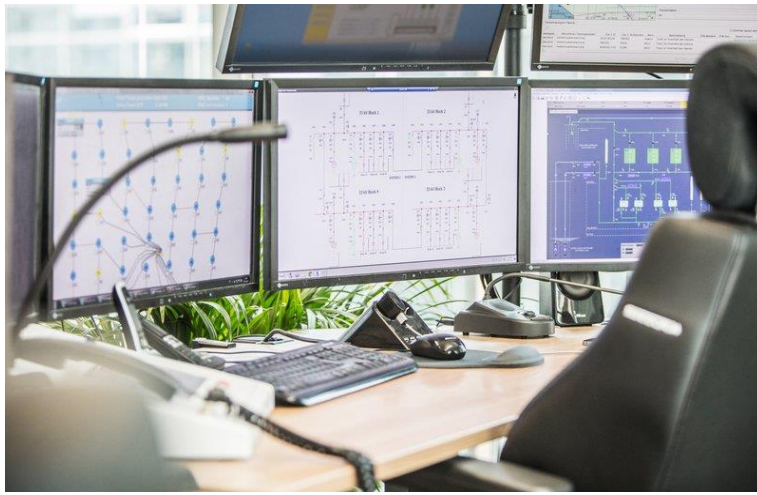
Dr. Arto Niemi,
Dr. Bartosz Skobiej,
Dr. Oscar Hernán Ramírez Agudelo

Introduction KUES

- Core task
  - „Design a GUI that allows to monitor selected indicators of Offshore Wind Farms.“
- For the presentation we will focus on data representation
- Different tasks were important
  - AIS Data
  - Turbine Data
  - Bayesian Network

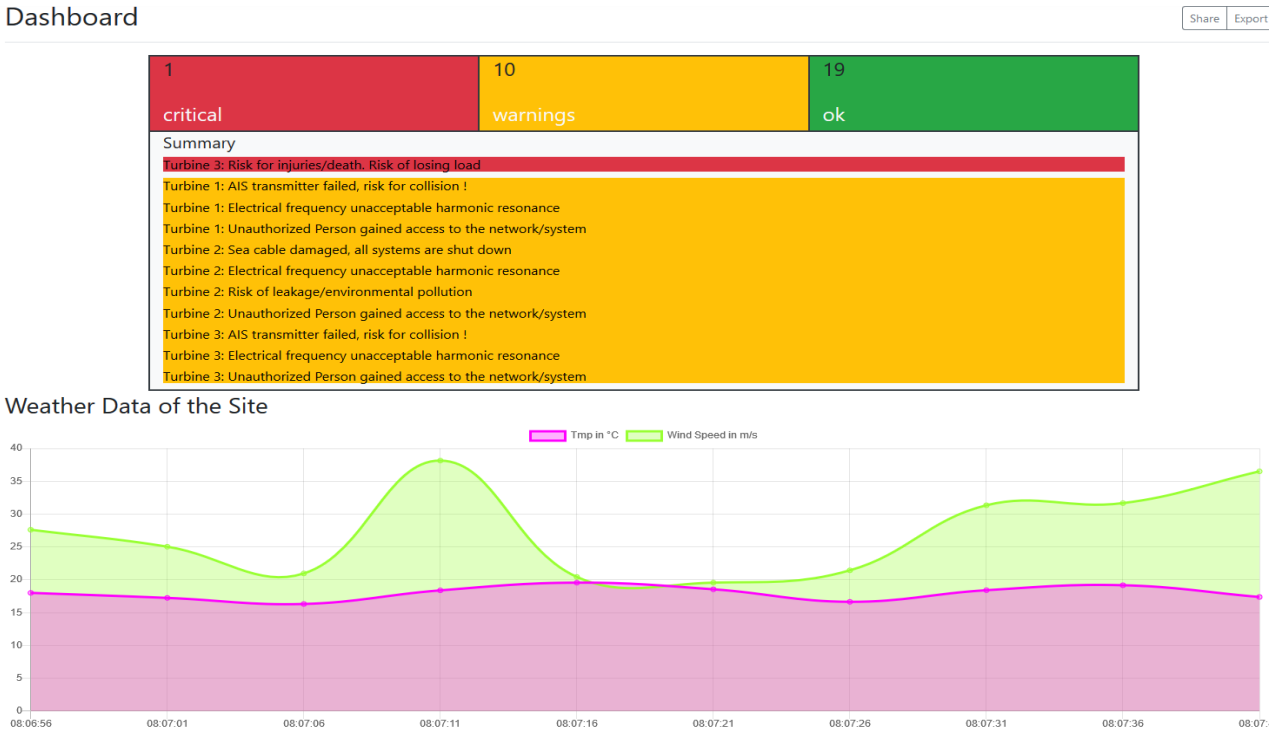




source: Dudgeonoffshorewind.co.uk, Globaltechone.de

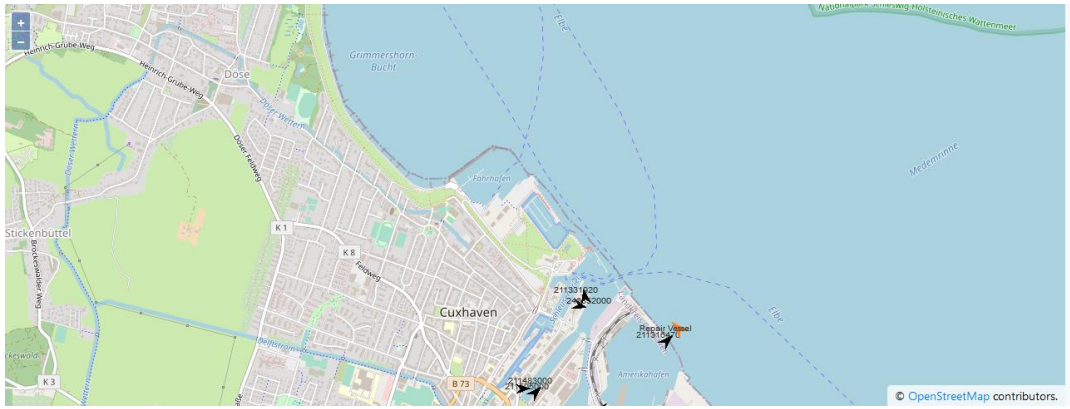
Methodology of the Framework

- Used Angular as a Framework
  - Allows for Single Page Application (SPA) approach
  - „A SPA is a web application that interacts with the user by dynamically rewriting the current web-page with new data from the web-server […].“
- Also used a small backend
  - Answering calls from the SPA
  - Responsible for pre-processing of data



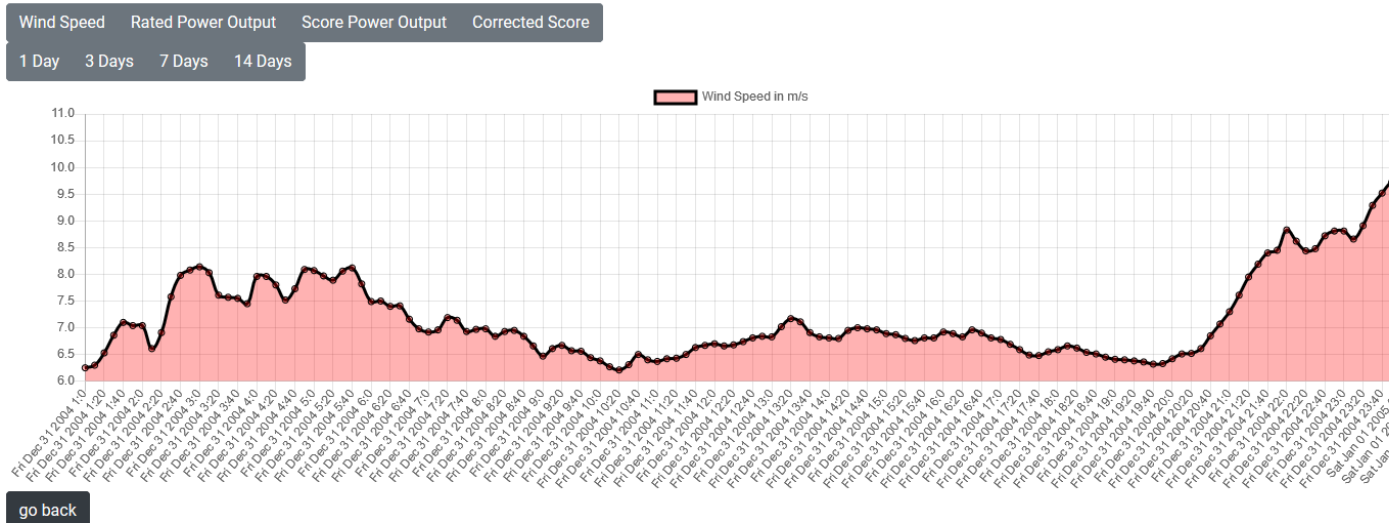
Source: https://en.wikipedia.org/wiki/Single-page_application

Implementation KUES

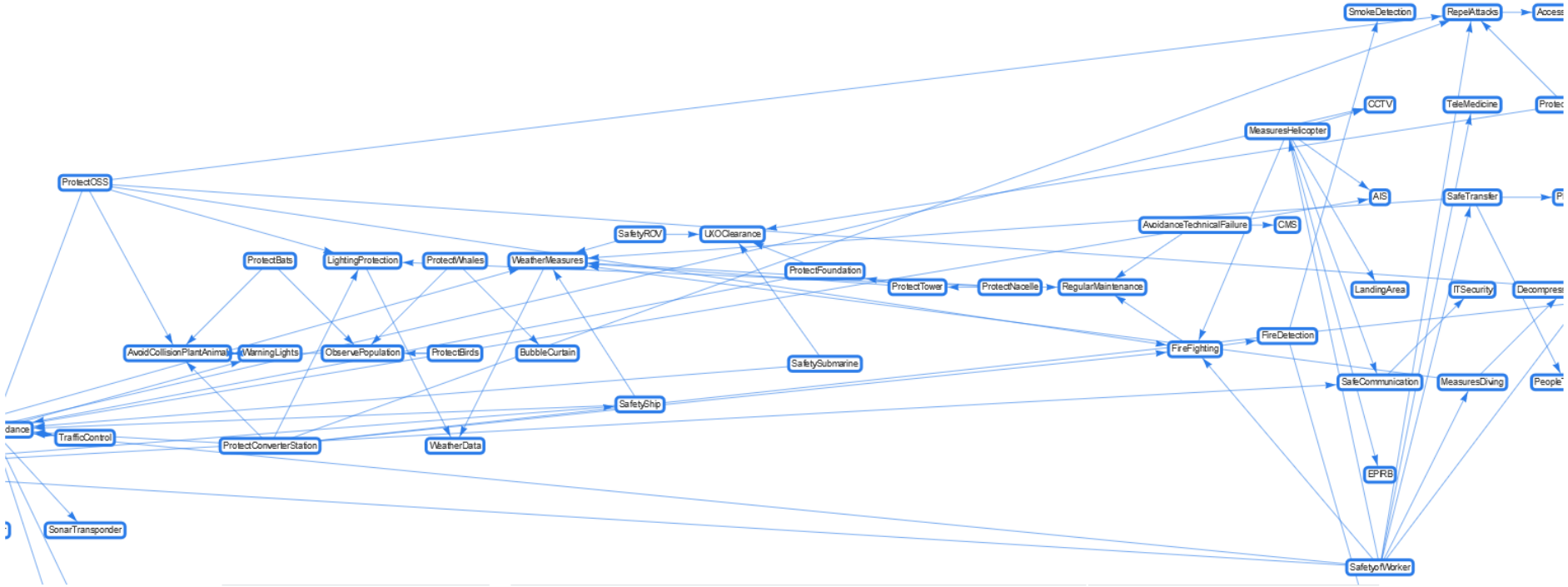


Selected Ship

MMSI: 12345678
Name: CTV
Destination: Cuxhaven
Persons: 7 People
Speed: 30km/h
Longitude: 8.718585894094577
Latitude: 53.867742303265835



Implementation KUES



#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate
1	ProtectFish	0.0050	17	RegularMaintenance	0.0050	33	SafeCommunication	0.0151	49	SafeTransfer	0.0050
2	ProtectBats	0.0050	18	PLB	0.0150	34	Trainings	0.0050	50	PreventEspionage	0.0050
3	MeasuresHelicopter	0.0051	19	AvoidManipulation	0.0050	35	ProtectCable	0.0050	51	CollisionAvoidance	0.0050
4	LightingProtection	0.0050	20	TrafficControl	0.0050	36	PPE	0.0150	52	ProtectNacelle	0.0151
5	SafetyROV	0.0201	21	ProtectBirds	0.0050	37	EPIRB	0.0050	53	ITSecurity	0.0150

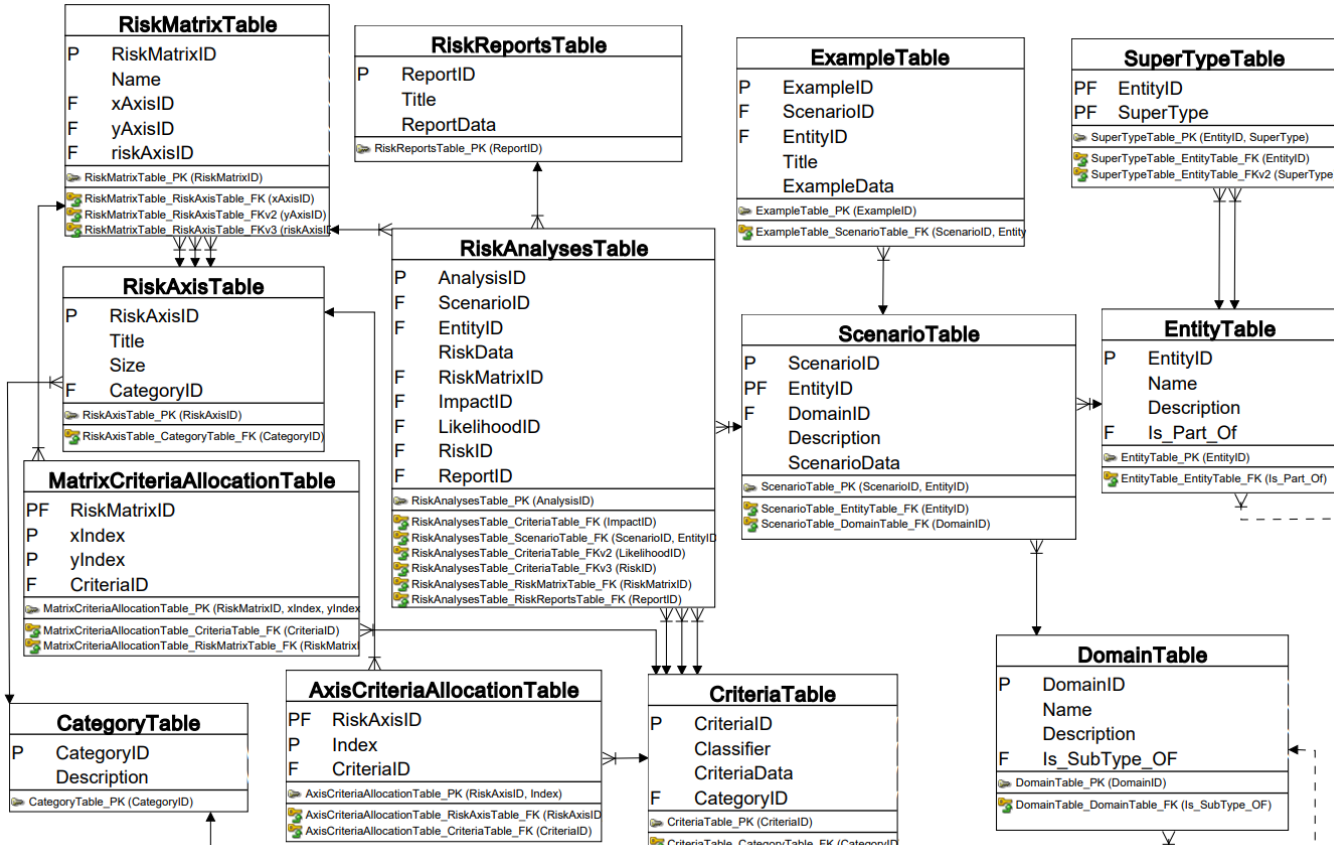
Python Code and Model by
Dr. Oscar Hernán Ramírez Agudelo

Introduction Risk Register

- A Database to store Entitys, Reports and Scenarios
  - Risks are assigned by the user based on data
  - User should compare current risk to stored risks and assess the situation
  - Theory and Database model were created by Dr. Arto Niemi

- Main goal -> Create a user friendly GUI
  - Search data and represent it for the user
  - Add new data

- Again Angular was used with a Python (Flask) backed



Implementation Risk Register

Deutsches Zentrum für Luft- und Raumfahrt

Search Database Add data

>> Personnel member

Entity: Personnel member

A person who is present in a professional context.

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Report: Quantification of Occupational Safety for Offshore Wind Farms

Scenario: A member of personnel is hit by ice falling from a wind turbine blade

Domain	Likelihood	Impact	Risk
Personel safety	Rarely occurs	Fatality, extensive or catastrophic damage	RGB: 255000000 description: Unacceptable residual risk which requires further safety measures

Report: Quantification of Occupational Safety for Offshore Wind Farms

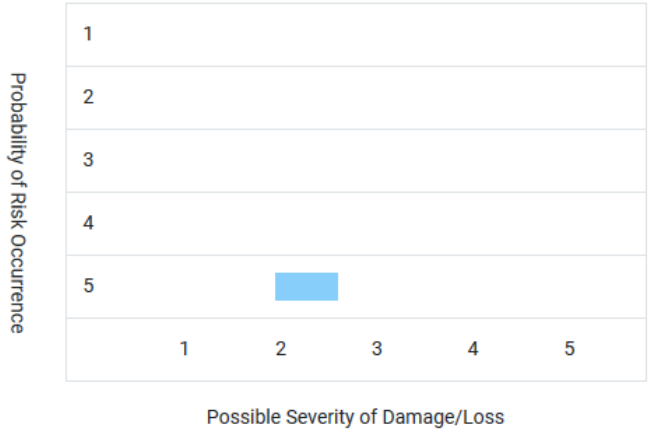
author: Jennifer Mielniczek

school: Jade University of Applied Sciences

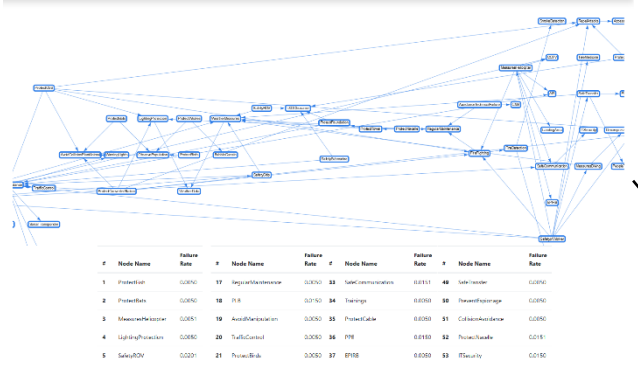
type: Master Thesis

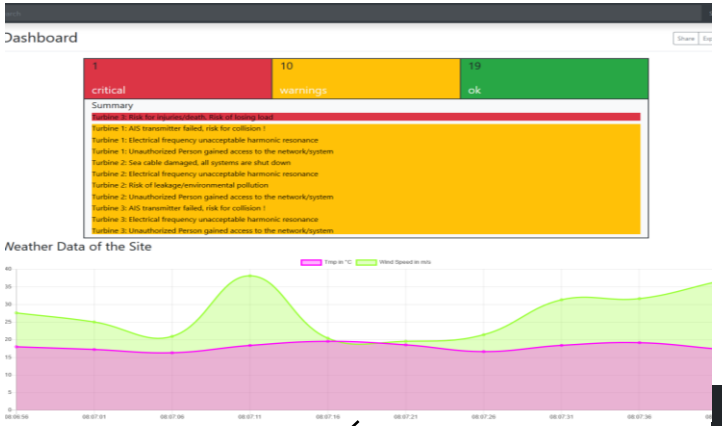
year: 2019

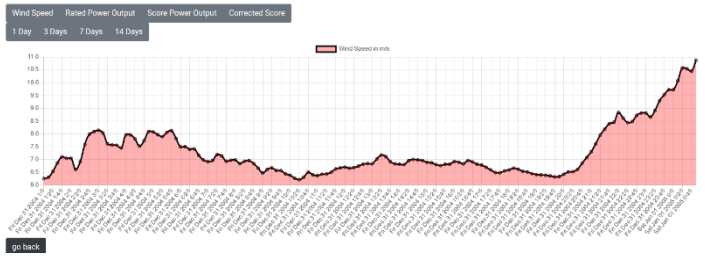
Scenario: A member of personnel is hit by ice falling from a wind turbine blade



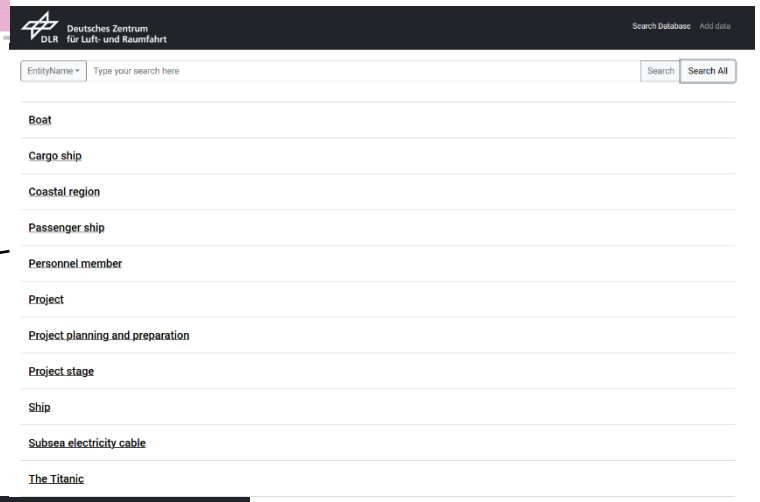
Visualization of the Framework

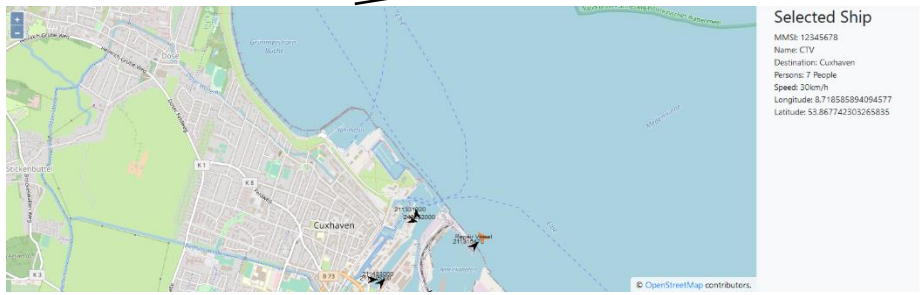


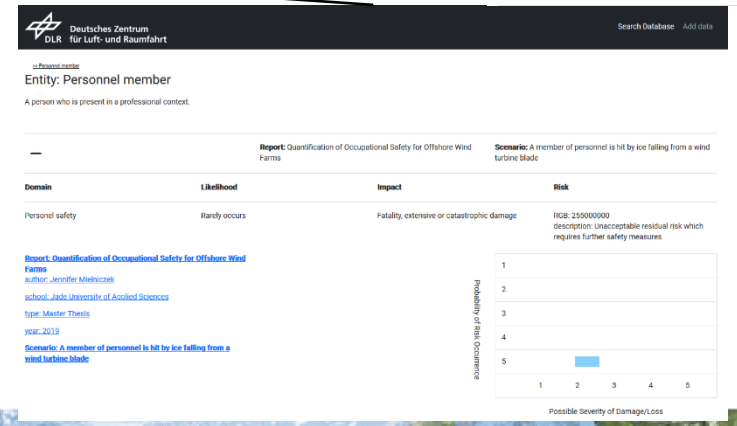




Framework







Conclusion

- Web applications are very flexible
  - As an example the map could also be used for (air) traffic visualization
- Allows for more interaction with data
- „Low“ entry level
  - Requires a bit of knowledge in TypeScript and Python
  - After this a lot of existing librarys can be used
  - JavaScript for easy front-end visualization

Thank you for your attention!

Questions

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